SPECIFIC FRAMEWORK FOR GEOTHERMAL REGULATION

Final version – Deliverable D 17

Recommendations &

Template for Country Specific Action Plans
Introduction

This document presents an overview summary of the GTRH framework for the purpose of identifying the main items crucial to the implementation of new or amended national geothermal energy legislation across the EU-27. These have been summarised here under the headings

Legal guidelines & specific measures

Support schemes

Policies and measures concerning the promotion of geothermal energy

It is intended that this document can provide a summary form of the GTRH framework for broader dissemination than the more technical framework document itself.

In addition in partner countries of the GTRH consortium where there is currently progress in legislative change in the area a specific addendum is provided showing how the GTRH framework had been applied in a national context.

1) Legal guidelines & specific measures:

These recommendations can be seen as being the need/requirement for national legislation to ensure that geothermal energy is regulated effectively either through existing or new legislation. This legislation must define geothermal energy clearly. Based on this definition appropriate regulation must then be adopted through the natural resources, hydrocarbons, mining, groundwater or planning laws or as a separate geothermal act.

- Define geothermal energy:
  ‘Geothermal Energy is the energy stored in the form of heat beneath the surface of the solid earth’ (as defined by the Directive on RES).
  Parameters describing the potential geothermal energy available for production could be used to further define the resource and mode of extraction. Depth, temperature, flow rates, end use, systems capacity/size could be used to steer the permitting process through which shallow and deep geothermal energy abstraction should be regulated in each country and exact parameters should comply with existing resource regulations.

- Clarify geothermal resource ownership:
  Legislation (through existing or modified natural resource legislation or separate geothermal legislation) needs to clearly define the ownership of the resource at a national level as well as nominating an authority with power to issue licences for exploration and development of the resource.

- Adopt a licensing system:
  The system will grant the licensee the exclusive right to exploration and exploitation of deep geothermal resources over a defined area for a defined period.

- Set priorities among natural resource use in a law in this order:
  Potable water use, water for agriculture, renewable energy, balneological, conventional energy and auxiliary uses of the underground, sports & recreational water use.

- Simplify regulations, administrative procedures:
  The degree of regulation of geothermal energy usage should be appropriate to the scale of use. ‘Large scale systems’ could be regulated through fitting licensing and planning acts. Small sized closed loop domestic systems should be the subject of a simple information submission.

- Reporting for geothermal resources inventory & statistics:
  The monitoring and collecting of geothermal resources data and statistics that allow the establishment of baseline market data as well as progress monitoring is essential

2) Support schemes:
National financial incentives in Europe have significantly facilitated the growth and development of national geothermal sectors, resulting in the uptake of both shallow and deep geothermal activities.

- Level playing field:
  An important element in the design of financial incentives for renewable energies is that a “level playing field” is achieved between the various RES options. This implies that geothermal energy should receive incentives similar to the support received by other renewable energy sources, be it in the form of grants, low interest rate loans, risk insurance, preferential VAT rates, feed in tariffs etc.

- Feed in tariffs and Emission Trading Schemes (ETS)
  The incentives could be based on the net CO\textsubscript{2} emissions avoidance from operating geothermal plants and/or a set of agreed heat feed-in tariffs based on a national feed-in tariff strategy for renewable heat and electricity. The development of a CO\textsubscript{2} emissions credit system (green certificates) for the operation of geothermal energy projects should be encouraged at national level to incentivise sector investment.

- No financial burden:
  There should be no or minimal licence fees or royalty payments for geothermal systems (shallow or deep) because the heat is continuously replenished (renewable) and therefore not “mined” in the conventional sense if used sustainably.

- Risk insurance:
  A Geothermal Guarantee and Risk Fund for deep geothermal exploration and/or development drilling should be made available. This type of fund typically covers the risk associated with exploration drilling and assessment of the resource. The geological risk exists especially at sites with only partially known subsurface conditions: the geothermal resource may be below expectations or, the flow rate insufficient etc. Risk coverage schemes should aim to cover the reimbursement of an adequate percentage of the initial investments.

3) Policies and measures concerning the promotion of geothermal energy:
A number of indirect accompanying measures are important for the development of geothermal energy sector. These should include the provision of comprehensive information on geothermal energy and the introduction of the appropriate technologies to professionals groups. Efforts should focus on adequately meeting existing national market demands in the geothermal area and ensuring the implementation of appropriate quality standards. A national consultative body (preferably a cooperative network of stakeholders and competent authorities) is recommended to have the responsibility for the development of targets, policies & instruments as well as the awareness campaigns and the monitoring of the geothermal energy sector.

- Measures addressing the building sector:
  Introduction of requirements for minimum levels of energy from renewable sources in new and existing buildings or
  Introduction of measures to be taken with equivalent effect: measures addressing new buildings and measures addressing existing building stock.

- District Heating and Cooling:
  District Heating schemes are an effective application of geothermal energy and a review of legislation and planning laws relating to the implementation of such schemes may need to be considered in order to provide better access to the most cost effective application of geothermal energy resources.

- Information & training / certification:
Educational strategies about geothermal energy for students, academia and professional bodies and institutions involved in the implementation of geothermal energy projects should be proposed. A certification scheme must be proposed for shallow geothermal installers and drillers. The accreditation process should differentiate between the design and installation of shallow and deep geothermal system, and ensure that the type and level of accreditation is appropriate for the experience and competence acquired. Standards on the deployment of geothermal technologies need to be prioritised and implemented.
Addendum A
Summary of new / ongoing Geothermal Regulation amendments Poland, 2009

General remarks:
1. No “geothermal regulations” sensu stricte have been functioning in Poland whereas there are several legal acts and decrees (geological and mining law mainly) some particular clauses of which refer to “thermal waters” [geothermal].

2. The term „geothermal energy” has been not in use in Polish legislation and related provisions. In some cases the similar term “Earth’s heat” has been used while speaking on shallow wells (less than 30 m) serving as borehole heat exchangers (BHEs) to extract geothermal energy.

According to the binding Geological and Mining Law, the term “thermal water” has been formally used to name groundwater reaching the temperature ≥ 20°C at the outflows from natural springs or water intakes (wells). Therefore one refers to e.g. exploration, assessment, exploitation, production etc. of thermal waters (aimed at heat/energy extraction) but not directly to geothermal energy. From the other hand, the term “geothermal water” has been commonly used by many geothermal professionals and stakeholders despite formal obligatory nomenclature.

The above results in a fact that some Polish regulations and provisions are not in convergence with some regulations from other EU-states (as well as with some clauses included into the EU Directive on RES promotion, 2009). Also some proposals included into the GTR-H „Final Regulatory Framework” are not adequate or do not directly apply to the country’s conditions. Therefore this situation urges to introduce the formal definition of „geothermal energy” as given in EU Directive on RES promotion (2009) and related terms into Polish regulations.

The Proposal of the new Geological and Mining Law was initiated and presented by the Minister of Environment in 2008. In course of 2009 it has been a subject of public consultations and than proceedings of the Polish Parliament. According to the governmental information, “the introduction of this Project aims to fulfill the EU-law” (www.mos.gov.pl).

The mentioned new Law will regulate the principles of activities related to geological works, mineral resource deposits’ and groundwater mining/extraction (incl. thermal waters), underground substances’ storage and underground waste storage. The proposed new solutions are more simple and more friendly for the entrepreneurs. They remove some barriers which impede undertaking and executing geological and mining activities as well as make possible rational management of natural resources deposits. Some from proposed clauses and amendments in New Geological and Mining Law refer to thermal [geothermal] waters. They are given below (as mentioned, the term „geothermal energy” does not exist in Polish legislation):

- thermal waters belong to the group of basic mineral deposits. By this fact a concession (licensing) for exploitation of them is required. According to still binding Geological and Mining Law all decisions related to exploration, prospection and exploitation of these waters are up to the Minister of Environment, and related activities require concession granting by the minister of environment (governmental level). The new G&NL proposes the transfer of competences for granting the licenses for thermal water (as well as healing waters and brines) to the regional administration level (the Marshal of regional office);

- the change in legal model of basic mineral deposits’ ownership is proposed – from complex ones to clear transparent regulations. The catalogue of deposits owned by the State Treasury will embrace strategic deposits important for economic development of the country (e.g. hydrocarbons, hard and brown coal, metal ores), beside them also thermal waters, among others.
Other deposits will be embraced by a land property. Exploitation of deposits owned by the State Treasury requires establishing of mining usufruct (a subject of contract) and is conditioned by granting the license;
- the regulations will be introduced which will simplify some administration procedures and shorten the concession process. This shall be mainly achieved through significant limitation the requirements to interact with other entities in course of these procedures.

In case of thermal waters the above means: introducing a one-stage system of licensing referring exclusively to the exploitation of thermal waters (while the stage of thermal waters’ exploration and prospecting for will not require a concession but only the approval by the marshal of voivodeship (regional administration office). Moreover, it will be not required to agree the boundaries of mining area and protective mining area with the President of the State Mining Authority and a deposit development plan, appended to an application for granting of a concession, will not require to be agreed with the director of regional mining supervision authority.

- decreasing some fees, e.g.: introducing 0% fee for geothermal water exploitation (till the end of 2006 this fee was 0.26 PLN/1 m³ of produced water what resulted in significant sums for entrepreneurs per year). It is also proposed to decrease the fee for the geological information used for geothermal water exploitation: to 1 – 5% of nominal well value (till 2008 the fee was 10% of nominal well value). One should also explain that the use of geological information at the stage of the project for exploration and prospecting for geothermal waters is free of charge, however the agreement of the minister of environment is required for its use;
- simplification in undertaking and conducting the mining and geological activities, including drilling the wells shallower than 30 m to “extract Earth’s heat” without the need to elaborate a project of geological works. In such a case a declaration only in a local administration office will be required;

However, the requirements referring to preparation the operation plan for mining plants in case of drilling shallow wells to tap „the Earth’s heat” become more restrictive, i.e. if the well is being drilled within the existing mining area or the depth of geothermal well exceeds 100 m, the works have to be made on a basis on the operation plan.

2. Financial support from the public sources
The National Fund for Environmental Protection and Water Management is a main entity granting financial support to the RES/geothermal projects in Poland (www.nfosigw.gov.pl). The Fund supports the RES development following general conditions common for All RES (however geothermal is not prioritized). In June 2009 a new decree was introduced by the Minister of Environment which shall create better conditions to subsidize geothermal waters’ exploration and assessment – it refers especially to the detailed conditions of public support if these waters are planned to be applied for energy production; the maximum support amounts 50% of costs. The financial aid in a form of grants, preferential loans, preferential bank credit, additional payments to preferential loans or credits, or partial sinking of preferential loans addressed to micro- and SMEs.

As pointed out by the authors of the above decree, „the objective of the regulation is to introduce a program of support for undertakings oriented to exploration and prospecting for geothermal water resources”. The regulation complies with UE-regulations.

The aid may be granted for the activities oriented to the exploration and prospecting for geothermal waters resources, namely designing, executing and reporting of geological works. These embrace: 1) preparation of constructing area incl. technological roads; 2) constructing works, incl. assembling of appliances, installations and equipment; 3) drilling or reconstruction of well along with technological works; 4) transport and utilization of drilling output; 5) geological and hydrogeological surveys, geophysical surveys, pumping tests, laboratory works; 6)
other indispensable services; 7) dismantling works and land reclamation; 8) elaboration of final geological or hydrogeological reports.

One may expect that this regulation will create an important supporting measure for SMEs interested in geothermal investments. Moreover that the growing interest with this sector has been observed what is expressed, among others, by the increased number of concessions issued for exploration and exploitation for geothermal waters: from 1 – 2 licenses before 2005 to 2 – 3 licenses in 2008 – 2009.

3. Closing remarks
The proposal of new Geological and Mining Law and new regulation on public support for geothermal activities granted by NFEP&WM don’t mention some essential tools being the subjects of GTR-H realization, i.e. establishing a Risk Guarantee Fund, lower the VAT tax included into the RES/geothermal heat price, introducing the „Green certificates”. One shall expect that they will be taken into account in the course of further works on introducing better legal regulations and economic incentives for geothermal following the solutions that had been worked out and proposed within the GTR-H activities and proven in the best - practise countries. To achieve this, the GTR-H outcomes, in particular the „Final Regulatory Framework”, need to be widely disseminated, lobbied and to receive a status of obligatory guidelines for UE and its member states.

However, the-above-listed new clauses and amendments in the proposal of new Geological and Mining Law or in new regulation on public aid have not been introduced as direct result of GTR-H activities and cooperation between its team and authors of new proposals. In fact, they include some postulates that had been expressed by geothermal stakeholders for a long time. They were once more analyzed and summarized by PAS MEERI team and some stakeholders during the GTR-H works and than proposed to consider them during the works on the governmental documents and regulations.

Except some single clauses introduced into amended geological and mining law and new regulation on financial support, their authors did not take into consideration several solutions resulting from the GTR-H process (such as establishing a Geological Risk Guarantee Fund). In this respect the decision makers were informed on the ongoing Project and its objectives, the representatives of the Ministry of Environment and National Fund took part in some GTR-H activities. One can expect that at least some from solutions proposed by GTR-H team will be introduced in course of further activities oriented to introduce better regulations enhancing geothermal heating development in Poland.

Most recently, the above amendments and new regulations in new Geological and Mining Law and in new decree on public support to geothermal projects were positively welcomed by the attendees of the II Polish Geothermal Congress (23 – 25 September 2009, 180 participants). However, the participants expect further initiatives and changes which will really create adequate friendly conditions for geothermal and enhance the sector development, including establishing of the Geothermal Risk Guarantee Fund, Green Certificates and lower VAT. The Conclusions of the II Polish Geothermal Congress point out, among other, the following issues:

- “Presented by the Ministry of Environment, Ministry of Economics, National Fund for Environmental Protection and Water Management the proposals of amendments and changes in legal regulations and new economic tools are aimed at mitigation of barriers for geothermal development in the country. They are regarded as first positive signals whereas the geothermal stakeholders represented at the Congress expect the continuation of this process and taking into account the postulates and recommendations justified during the Congress [based on GTR-H works, specially “Final Regulations Framework”],
- “The Congress participants recommend the continuation of cooperation with relevant ministries, governmental agendas and Polish Parliament to create better conditions for geothermal development in Poland”,
- “The Congress participants regard as indispensable the undertaking of activities aimed at elaboration of EU Directive on Promotion of geothermal energy development both at EU and EU-member states levels. The Directive shall remove the legal, organizational and financial barriers for geothermal”,
- “It has to be pointed out that during last two years seven new geothermal bathing centers have been built in Poland. They resulted from the activities of private investors (despite disadvantageous formal and legal conditions). Several next geothermal projects are being at various realization stages (heating, bathing). Obviously, introduction more favorable regulations will contribute to dynamic realization of many new undertakings thus resulting in increased use of geothermal and, among other, in new places of employment”.

References:

- Act from 4th February 1994 - Geological and Mining Low (uniform text, 1994 no 27, with changes) (www.mos.gov.pl)
Addendum B

Legislative progress in Hungary - In association with the GTRH Framework Recommendations

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Introduction

The duration of the EU ALTENER GTR-H project in the period 2006-2009 coincides with hectic but slowly progressive years in Hungary with regard to new legislation making that regulates the prospection, exploitation and utilization of geothermal energy in a broad sense. This coincidence is not accidental or random. The national and international events and outcome documents generated by the GTR-H consortium and the Hungarian partners add a lot to the lobby impetus and to the decision-making government levels’ efforts.

The present short summary on the national legislation achievements discusses the subject in a time-wise order treating both the important GTR-H events and the national milestones. The report is also an attempt by providing a review on the development of this segment of the renewables industry with a focus on the indicator approach.

GTR-H related activities and milestones in Hungary, a target country

2006 December: Dublin kick-off meeting
The project workplan and administration were approved, the project launched.

2007 February: Conference and GTR-H national roundtable, Kistelek
The event of 150 participants was organized by the Hungarian Thermal Energy Society with international GTR-H and Hungarian lecturers. GTR-H objectives were presented, the first national roundtable discussion was carried out with the distribution and the filling of the GTR-H questionnaire. Facility visits were also organized.

2007 May: Selected stakeholders interviews
Interviews were organized and the summary report on three competent stakeholders interview was compiled.

2007 May: National profile report
The report on the review of the national legislation with regard to geothermal energy and on the assessment on the existing legal (and other) barriers was accomplished. The results of the questionnaire and the first roundtable discussion were also presented and evaluated.

2007 August: 2nd GTR-H consortium meeting, Budapest
The Hungarian state-of-art was presented in-depth, and a balneology facility visit was organized.
2007 November: Conference of the Hungarian Office for Mining and Geology (MBFH), Visegrád
For the first time, the title and topic of the annual public convention of MBFH was extended with the geothermal energy issues. The results of the GTR-H national report were presented, the discussion session was moderated along the GTR-H concept. The concept of the “geothermal protective pillar” was also introduced.

2008 February: Conference and GTR-H national roundtable, Kistelek
The event of 200 participants was organized by the Hungarian Thermal Energy Society. The general discontent of the stakeholders with the present legal regime and financial instruments led to the issue of the “Second Kistelek Declaration”, which is focusing on the financial burden of this industry (e.g. multiple taxation), the lack of sound financial support policy (e.g. electricity trade-in-tariff, explicit EU funding priority).

2008 March: Germany (Erding) Best Practice Tour
The Hungarian delegation of six MBFH colleagues and two stakeholders (Ministry for Environment and Water, Hungarian Parliament) participated on the meeting and facility visits organized by the German partners.

2008 March: 3rd GTR-H consortium meeting, Berlin
The first draft of the GTR-H template framework was presented and discussed, as well as the national progress in the field.

2008 March: Public discussion of the report on the status of geothermal energy in Hungary, headquarter of the Hungarian Academy of Science, Budapest
Upon the request from the Prime Minister’s Office the Hungarian Academy of Sciences established a group of competent experts, one of them was the Hungarian GTR-H partner, to prepare a status report on the potential, performance and legal drivers on the geothermal energy industry.

2008 April: Conference of the Hungarian Geothermal Association, Veresegyház
The event focused on the use of geothermal energy in the agriculture, horticulture, and the potential of re-activating “dry” hydrocarbon exploration wells.

2008 September: 4th GTR-H consortium meeting, Krakow
The best practice and target countries profiles summaries were presented and finalized. The template legal framework of GTR-H was discussed and finalized.

2008 November: Conference of the Hungarian Office for Mining and Geology, Visegrád
As an invited GTR-H lecturer Burkhard Sanner held a keynote paper on the EU success stories in the geothermal field at the plenary session. On the second day there was a two hours discussion session as the second official GTR-H national roundtable.

2009 June: Conference of the GEKKO Fund and annual assembly of Hungarian Thermal Energy Society, Szeged
Tamás Hámor, the lead GTR-H partner in Hungary made a presentation on the best practices in EU Member States based on the results of the GTR-H Best Practice Countries work package. A publication with this topic is expected to be published in “Magyar Közigazgatás” in November 2009.

National legislative and decision-making milestones

2007 January: Regulatory merger
The Act No. CIX of 2006 stipulated the merging of the Hungarian Geological Survey into the Hungarian Bureau of Mines, to establish the Hungarian Office for Mining and Geology, a strong regulatory government agency in mining and geology affairs, with monopolistic competence in geoinformation management and service too.

2007 June: **The concept of the geothermal protective pillar**
A meeting with the participation of ca. 20 competent experts was organized by MBFH to present the first concept on the introduction of the “geothermal protective pillar”, a legal instrument similar to the mineral exploitation plot (or acreage in US), in order to ensure both the sustainable exploitation of geothermal energy and the safety of investors.

2007 July: **New act on electric energy**
Act No. LXXXVI. of 2007 in harmony with the relevant EU community law introduced, inter alia, a set of legal instruments for renewables (definitions, obligatory trade-in, green certificate, etc.). The implementing Government Decree No. 273/2007. (V. 19.), and later the GKM ministerial Decree No. 110/2007. (XII. 23.) were also published.

2007 July: **A deficient regulation on EU funding eligibility**
MeHVM Decrees No.19/2007. (VII. 30.) and 23/2007. (VIII. 29.) on the rules of the financial support of regional development, environmental and energy projects were published. This scheme addresses the distribution of those seven years (2007-2013) EU funding which remains with the Member State allocation right and disposal. However, geothermal heating projects and heat pump installations were explicitly mentioned among the eligible projects but geothermal electricity power plants were excluded.

2007 November: **Amendment of the Mining Act**
The Act No. CXXXIII. of 2007 amended the Mining Act for several reasons, one of which was the more accurate regulation of the geothermal field. The most important part of the amendment was the insertion of a new Article:

1. “22/B. § (1) FOR LICENSING AND SUPERVISING EXPLORATION OF GEOTHERMAL ENERGY, RULES OF LICENSING AND OFFICIAL SUPERVISION OF GEOLOGICAL EXPLORATION SHALL BE APPROPRIATELY APPLIED.
2. (2) EXPLOITATION OF GEOTHERMAL ENERGY SHALL ONLY BE FROM THE PART OF EARTH’S CRUST DESIGNATED FOR THIS PURPOSE (PROTECTIVE PILLAR).
3. (3) THE PROTECTIVE PILLAR IS DESIGNATED BY MINING SUPERVISION.
4. (4) WITHIN THE PROTECTIVE PILLAR ESTABLISHMENT FOR EXPLOITATION OF GEOTHERMAL ENERGY CANNOT BE PERMITTED FOR ANOTHER ENTITY WITHOUT THE WRITTEN AGREEMENT OF THE LICENSEE.
5. (5) GEOTHERMIC PROTECTIVE PILLAR IS REGISTERED BY MINING SUPERVISION.”

The amendment also authorized the Government to issue a decree to regulate the technical and licensing details of the establishment of the geothermal protective pillar.

2007 December: **New decrees on thermal water extraction**
Government Decree No. 379/2007. (XII. 23.), and the Decrees No. 94/2007. (XII. 23.), 101/2007. (XII. 23.) of the minister for environment and water (KvVM) contain numerous regulations and technical details on the thermal wells drilling, design, documentation. However, these decrees generated some legal collision or duplication with the requirements of the mining law and the geothermal protective pillar legislation in preparation, and also left some niche in the field. A practical indication of this was a later gas outburst of a thermal well during drilling which was licensed by the water authority without the involvement of the mining inspectorate for its consent.

2007 December: **Trade-in tariffs for renewables**
For the further implementation of the Electric Energy Act the Government Decree No. 389/2007. (XII. 23.) was published that set preferential prices for geothermal power plants. This decree has been amended several time since then.

**2008 March: Simple mining royalty rules**
The Government Decree No. 54/2008. (III. 20.) on the calculation of mining royalty of minerals and geothermal energy annulled the previous regulation (Gov. Decree No. 118/2003 (VIII. 8.) and made the calculation for geothermal energy more simple and easy by setting the nominal value 1650 HUF/GJ (ca. 6€/GJ) for installations operating with involvement of groundwater extraction, and 320 HUF/GJ (ca. 1.5 €/GJ) for closed circuit systems.

**2008 March: Proposal for licensing geothermal facilities**
A legislative proposal was prepared by MBFH and submitted to the minister for transportation, communication and energy (KHEM) to amend the ministerial decree No. 96/2005. (XI. 4.) GKM on the specific construction licensing procedures of the mining authority and more precisely include geothermal installations and their licensing procedures. However, it has not been approved ever since.

**2008 April - : Negotiations started between the Hungarian Office for Mining and Geology and the Ministry for Environment and Water on the concept of a Government Decree on geothermal protective pillar**
The talks focused on the definition of the geothermal protective pillar, a new legal term introduced by the Mining Act in January 2008. The major argument of the Ministry for Environment and Water was that the existing water licenses function properly for the exploration and exploitation of geothermal energy. They questioned if there is a need for new legislation at all.

**2008 Spring: Numerous licensing applications submitted for geothermal projects on basis of the amended Mining Act**
Numerous requests were submitted both to the mining and to the water authorities for geothermal energy and/or thermal water exploration or exploitation license. The same applicant often submits the same application for both competent authorities. It happens that several requests arrive to the same or overlapping areas, and sometime it overlaps with existing oil and gas plots too. In these cases the mining inspectorates issued, on a first-come first-served basis, so-called geological prospect permits which do not ensure exclusive access for the licensee. The water authorities issue a preliminary water exploitation permit which provides 1+1 years for the licensee for the exploration and drilling the well.

**2008 June: Geothermal plants became eligible for funding**
NFGM ministerial decree No. 7/2008. (VI. 5.) amended the MeHVM decree No. 23/2007. (VIII. 29.) by inserting the electricity generating geothermal power plants among the eligible activities for EU support.

**2008 October: Renewables strategy published**
Government Decision No. 2148/2008. (X. 31.) on the renewable energy strategy 2008-2020 was published.

**2009 February: Preferential electricity prices for heat pumps**
The Heat Pump Association set an agreement with electricity supply companies on a favourable supply price for heat pump users. The new deal was introduced and widely advertised during the spring.

**2009 April: First-instance Court jurisdiction on interpretation of “geothermal exploration”**
Since the beginning of 2008, the “new wave” of licensing applications for geothermal energy exploration permits were submitted to MBFH, and the mining inspectorates interpreted the claims as request for geological prospection. According to the Mining Act this legal instrument does not ensure an exclusive right for the licensee, as compared to the minerals exploration permit which does. During the jurisdiction phase of appeal in a given case the Court ruled out that the latter legal format shall be used.

2009 June: First attempt for a waiver for re-injection failed
An amendment of the Act No. LVII. of 1995 on water management was approved by the Parliament that made possible the authorization of the exclusion from the general obligation of re-injecting groundwater extracted for energy exploitation purposes. However, László Sólyom, the President of the Republic of Hungary vetoed the amendment and sent it back to the Parliament for further re-conciliation.

2009 June: Amendment of the Mining Act submitted
Due to the growing political and economic pressure from lobbyists, and to the unsuccessful conciliation talks in the subject of regulating the geothermal protective pillar an amendment of the Mining Act was submitted to the Parliament. The bill proposed a clear and exclusive licensing scheme for all geothermal projects by MBFH also including the activities where groundwater extraction is involved. It prescribed a licensing scheme similar to hydrocarbons, with an exclusive right for the licensee already at the prospection phase. However, the discussion of the bill was postponed to the 2009 fall semester of the National Assembly.

The development of geothermal industry in 2006-2009
Since no comprehensive official quantitative figures are available in Hungary to reflect the changes in the performance of the geothermal energy industry, therefore this chapter of the report presents the relevant data of the period 2006-2009 (as on 5th of August) that are available at the Hungarian Office for Mining and Geology. These data are extracted from the general electronic file administration registry of MBFH, which was searched for terms “geothermal”, “heat pump”, and “thermal water”. After item-by-item checking in order to screen out the not new or irrelevant (e.g. data service) requests and administrative procedures the results are shown in the table below. For 2009 we extrapolated the figure from the first seven months sum for the whole year.

The change was dramatic in the last two years, the figures are doubled. For most part of this the growing heat pump industry accounts. In addition to that, there were ca. 40 claims for geothermal energy exploration projects submitted in 2008 and ca. 60-70 is extrapolated for 2009 upon the data available until July.

This increase can be explained by the following:
- hectic international gas market and high gas price;
- new electricity trade-in tariffs for geothermal power plants;
- new national financial scheme for renewables in distributing the EU funds;
- favourable amendment of the Mining Act;
- preferential electricity tariffs for heat pumps; of which

at least the last three factors were directly or indirectly effected by the GTR-H recommendations and appearance in the Hungarian geothermal fora.

MBFH also manages the mining royalty database but the overall sum paid by geothermal users during the GTR-H period was rather constant and negligible (ca. 120k€ equivalent).
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**Conclusions**

Geothermal energy applications met numerous challenges in Hungary in the last three years, not only due to legislation barriers but because of certain opposition by other lobbies that consider geothermal energy as a potential future competitor. The mining authority is supportive for the field but some mining companies, especially oil and gas enterprises look at geothermal energy with a certain suspicion, as a potential competitor. This does not necessarily mean economic conflict of interest but an interference and collision on the same natural resource domain (i.e. geological reservoirs, groundwater) on which they already have exploration and exploitation rights. However, a few oil and gas companies already extended their rights to geothermal energy exploitation as well.

Healthcare, tourism and regional development sector explicitly backs the development of geothermal energy use, mainly because of the hot spas and medical applications. The rural world is supportive too because in Hungary there is a great tradition of thermal water heated greenhouses.

The role of the energy sector is rather contradictory. The officials support the development of geothermal energy as one of the renewables, but biomass has a declared priority among them. Major energy lobbies look at the geothermal field as a minor competitor. The green lobby treats it in a similar way, they acknowledge as an environment-friendly renewable but the polluting emissions into surface waters mainly by agriculture users and spas generate a significant opposition too. The quantitative water management supervision is rather aware of the negative impacts of thermal water use, e.g. the falling groundwater levels and temperatures of the Pannonian Basin due to the overexploitation during the last 40 years.
Concerning the legislation in Hungary the exclusive usage of the permit field is not guaranteed. The exclusive usage of the applied water reservoir of the applicant is also not secured by the law. The possible solution is the definition of a permit area with a simple “single-window” application procedure, and later an exploitation area including modelling for the evaluation of the reservoir via the establishment of a geothermal protective pillar.

Concerning the general conclusions of the study on the legal barriers:

- Hungarian legislation relevant to geothermal energy is spread throughout mining, water, and energy fields;
- financial burden of geothermal projects is multiple, and likely greater than in other EU Member States;
- the long-term safety/interest of investors is not satisfactory (neither from legal nor financial point of view);
- regulatory authority framework has become somewhat simpler due to public administration reform of 2006 but yet many criticise the long licensing period;
- near future improvements in legislation are foreseen (e.g. amendment of the Mining Act).

However, in spite of all the existing barriers the administrative indicators (number of submitted permit applications) for geothermal projects and ground source heat pumps show that this segment of the renewable energy industry is growing fast, and the rate of increase is 100 % year by year as detected in years 2007-2008-2009. There is a strong evidence that factors driving these changes are at least indirectly related to the activities and outcome recommendations of the GTR-H project of the European Union ALTENER Programme in Hungary.
Addendum C
Summary of public consultation process on Geothermal Energy in Ireland

Workshop 1st September 2008
Report Date 24th July 2009

1.0 SUMMARY

• Thirty two submissions were received. The majority of the identifiable submissions were from people involved with geothermal energy and include a number of detailed points that merit close consideration. There is little or no consensus on most issues.

Classification
• There should be differentiation between different forms of geothermal energy, especially for regulation.
  • Closed-loop Ground Source Heat Pumps are generally seen as a distinct category, but otherwise there is no consensus on what just criteria should be used. Depth is the most commonly favoured option, but end-use was also considered to be of primary relevance.
  • The main current interest is on shallow systems both closed and open loop.

Commercial exploitation
• Space heating/cooling for commercial buildings is widely seen as the most promising area in Ireland, using shallow groundwater (<300m) as the heat source.
  • Closed-loop Ground Source Heat Pumps will continue to be significant especially for domestic buildings.
  • There is some potential for district heating.
  • Small scale (1 – 5 MW) electricity generation was mentioned as having some potential by five respondents.

Barriers to Further Development
• Lack of knowledge of the resource is seen as the biggest barrier to increased utilisation, followed closely by lack of financial incentives.
  • Regulatory uncertainties and issues with knowledge and expertise with the technology were the other issues mentioned most frequently.
  • The (geological) knowledge base for deep geothermal resources is inadequate.
  • The knowledge base for shallow resources is adequate but awareness is confined to a narrow group.
  • Concerns over the lack of quality standards and service and consequent damage to the image of geothermal heating are significant for GSHPs.

Solutions
Knowledge
Promote value of shallow geothermal energy to consumers, architects, developers, etc. e.g. through workshops and demonstration projects with both industry and Government involvement (high level of support).

Government support will be required for collecting and disseminating geothermal energy resource information (especially on deep resources), including establishing a dedicated unit with responsibility (in DECNR (GSI, EMD) or SEI).

Regulation
Planning laws and groundwater legislation are most favoured for shallow developments.
Significant support for legislation analogous to minerals or hydrocarbons for deep developments. Majority support for a permitting system for deep exploration and exploitation, but most considered it was unnecessary for shallow systems. DCENR would be favoured agency for such licensing.

Significant support for some form of regulation to ensure high standards of installation. A number of submissions have made detailed proposals.

Economic
Wide variety of financial incentives suggested.

2.0 INTRODUCTION
One of the main tasks of the departmental Working Group on Geothermal Energy was to undertake a national consultation exercise seeking the views of industry and the public on the development of geothermal energy in Ireland; the barriers to its exploitation; views as to how these could be overcome; and possible frameworks for its regulation.

Public consultation on geothermal energy took place between 3rd June and 8th August 2008. The exercise consisted of 18 questions (all cited below), and allowed for submissions to be made online, by email and by hard copy. 32 submissions have been received from the following stakeholder categories:

- public bodies (Dublin City Council, Carlow Kilkenny Energy Agency, Association of Irish Energy Agencies);
- consultants (OGE Ltd., GTR-H, Hot Dry Rocks Pty Ltd., CSA Group, Matheson Ormsby Prentice, Conodate, Minerex Environmental Ltd., TOBIN Consulting Engineers);
- professional and representative bodies (IGI, GAI, South Dublin Chamber);
- energy industry (Geothermal Energy Ltd., Surface Power, Buildings Energy Unit UCD, one unidentified);
- academia (2);
- landowners (1), potential developers (1), and private persons (4);
- unidentified (6)

Below is a summary of responses received to each question. We have mainly adopted a qualitative approach to this questionnaire and decided to quote some of the more detailed solutions directly from the submissions. Statistical information on the submissions in the form of graphs is included for some answers despite a relatively modest sample. For the purpose of this summary the comments were at times taken out of the context of particular responses: To do them justice, please refer to the full submission summary document and do not draw conclusions based on the graphs only. Online submissions which did not contain responses to more than one question and which did not indicate the category or name of the contributor are indicated on the full submission summary document, but were not considered for statistical purposes in the below review. The full content of each submission received will be published shortly on the consultation website.

4.0 CONCLUSION
This public consultation exercise has delivered a range of possible approaches to the regulation of Geothermal Energy in Ireland. A round table discussion with all interested parties and looking into the above questions in more detail would probably help in reaching the best possible solution for the regulation of geothermal resources in Ireland. The exercise proved that there is a significant interest in this branch of renewable energy sources.
If any immediate conclusion can be drawn from this public consultation, it should probably state that, given Ireland’s geology and geothermal potential assessed to date, the local authorities would continue to carry the major responsibility for regulating geothermal developments through the application and extension of planning laws. Additionally, one of the government departments (DCENR was mentioned 13 times in Question 16 above, DEHLG 6 times) would most likely be in charge of licensing (regulating) the deep and commercial developments with EPA controlling the environmental aspects, and CER potentially becoming the regulatory body once high enthalpy resources/new technologies are developed. The importance of a precise definition of various types of ‘geothermal energy’ for the purpose of regulation is a pre-requisite for discussing most of the above questions in more detail. This consultation exercise should help to bring about such definition.
Addendum D
Geothermal Regulation Framework - The Netherlands Country Addendum

December 2009

Introduction
The GTR-H project is concerned with the regulation of geothermal energy for heat in the EU. An analysis of the existing regulatory frameworks for geothermal energy Member States has confirmed that the effective regulation of geothermal energy needs a sound legislative basis. This may be achieved through new policies, the modification of existing legislation, the introduction of new legislation or a combination of all. Existing legislation for natural resources, hydrocarbons, mining, geology, groundwater or planning may cover aspects of geothermal energy exploration or development, or legislation specifically for geothermal energy may be made. The choice will be up to the individual country and may depend on the scope of existing legislation or be a matter of policy. This document sets out the country specific priorities be it in the domains of legislation, policies or other relevant issues for the Netherlands. The Dutch country specific addendum is a deliverable of the Dutch Geothermal Platform (Stichting Platform Geothermie or SPG) – partner of the GTR-H consortium. The Dutch Geothermal Platform focuses on deep geothermal activities and the comments and remarks in the domain of shallow geothermal have been invited from the NVOE (Nederlandse Vereniging voor Ondergrondse Energieopslag = Dutch Association for Underground Energy Storage). The remarks and comments of NVOE have been taken on board and integrated in the Dutch Country Specific Addendum. The Dutch Country Specific Addendum follows the structure of the Template for a Geothermal Energy Regulatory Framework and comments refer to the specific articles of this template, annexed to this document for that purpose.

A.1.1 “Geothermal Energy’ is the energy stored in the form of heat beneath the surface of the solid Earth” (as defined by the RES Directive 2009/28/EC). Currently different terms exist in legal and regulatory acts referring to geothermal sector. It is recommended to unify the basic terminology using only the term ‘geothermal energy’, with a view to introducing transferable clear solutions and incentives from country to country and in the EU as a whole.

Priority 1 The RES directive 2009/28/EC definition should be adopted.

A.3.1 Existing national natural resource, geological, water abstraction/ exploitation, environmental, planning and building legislation can be used, with modifications if necessary, to regulate the shallow and deep geothermal sectors. However the regulatory burden for shallow systems should be minimised: - for example, it is recommended that small closed loop domestic heat pump systems should be the subject of a simple notification rather than licensing process.

Priority 2 In the Dutch situation there is no legislation for closed loop systems. There should be a simple notification procedure for the small systems (similar as stated in recommendation A.4.3). Bigger systems must be legislated in a (simple) licence procedure.

A.3.2 Geothermal resources defined and regulated under existing legislation (such as minerals, mining, hydrocarbons, water or planning) could be followed by a new Geothermal Act to address any shortfalls identified in the legislation once the licensing system has been in operation for several years.

Priority 3 The on-going revision of the Mining act and it’s underlying legal & permitting framework should be used to reform the current practical constraints for geothermal permits – as indeed the nota “Warmte op Stoom” has announced. A response to the present barriers should be
incorporated in the “Geothermal Permit” concept – in a consultation with the geothermal community stakeholders.

A.3.2 Shallow geothermal energy exploration and development for large scale systems could be regulated through local planning laws where the local government body could be the licensing authority.

Priority 4 In the Dutch situation it must be determined whether this must be the municipalities, water boards or provinces (states). It is recommended that where possible rules and regulation should be stated at national level, this to ensure as clear and unambiguous regulation as possible.

A.3.8 The geothermal licensing authority should be responsible (with the other licensing authorities) for ensuring that there are no conflicting rights relating to overlap of geothermal licences with other resources or licences.

Priority 5 For shallow systems overlap of geothermal influence-areas is often considered to be positive (if correctly engineered and reflected). In the current situation Dutch authorities often take the lead in creating so called Master plans for “busy” areas.

A.3.12 The administrative process for the granting of a deep geothermal exploration or development licences should not exceed an overall period of six months.

Priority 6 The options for reduction of the duration of the ‘geothermal permit’ should be investigated. 

A.4.2 The degree of regulation of shallow geothermal energy usage should be appropriate to the scale of use. ‘Large scale systems’ could be regulated through existing local planning laws when necessary. In the case of open loop geothermal systems a groundwater pumping flow rate threshold could be used to define projects requiring a groundwater abstraction/exploitation licence in accordance with national legislation. A capacity threshold could be applied in the case of large multiple borehole collector arrays. The licensing authority could set minimum and maximum water temperatures for re-injection from geothermal systems for geothermal and aquifer management purposes.

Priority 8 The application of different scales of regulation for shallow geothermal energy is recently developed within the NVOE. With the engagement of the new Water Act in 2010 the NVOE has set a proposal for guidelines for legislation in resemblance with the recommendations in A.4.2. These guidelines should be engaged in the decree on shallow geothermal energy under the new Dutch Water Act and existing Soil Protection Act.

A4.6 Appropriate exemptions from the national planning regulation and environmental impact assessment regulations should be considered for geothermal energy projects in order to assist in the development of the sector.

Priority 10 Exemptions of Environmental Impact Assessments should be regulated by the Mining Act and secondary legislation similar to (the EIA exemptions of) exploration and development of oil&gas reserves.

B FINANCIAL INCENTIVES GUIDELINES:
Financial Incentives Schemes (FIS) play an essential role in promoting the development of national shallow and deep geothermal energy sectors for heating and cooling. National Government financial incentives in Europe have significantly facilitated the growth and development of national geothermal sectors, resulting in the uptake of both shallow and deep geothermal activities. An important element in the design of financial incentives for renewable energies is that a “level playing field” is achieved between the various RES options. This implies that geothermal energy should receive incentives similar to the support received by other renewable energy sources in the form of financial assistance for initial feasibility studies, grants,
low interest rate loans, risk insurance, preferential VAT rate, feed in tariffs or certificates for geothermal heat units produced-installed.

Priority 11 Deep geothermal energy is still relatively new to the Dutch scene. This is reflected by serious discrepancies in financial stimulation instruments – compared to other sustainable (RES) options. These discrepancies should be addressed aiming to a level playing field for RES incentives, preferably based on avoided CO2 (see B.3.2).

C GENERAL GUIDELINES FOR FLANKING/SUPPORTING MEASURES:
A number of indirect accompanying measures are important for the development of geothermal energy sector. These should include the provision of comprehensive information on geothermal energy and the introduction of the appropriate technologies to professionals groups. Efforts should focus on adequately meeting existing national market demands in the geothermal area and ensuring the implementation of appropriate quality standards. A national consultative body (preferably a cooperative network of stakeholders and competent authorities) is recommended to have the responsibility for the development of targets, policies & instruments as well as the awareness campaigns and the monitoring of the geothermal energy sector.

Priority 12 For the Dutch situation in the domain of deep geothermal (direct use) a consultative body consisting of geothermal community stakeholders and competent authorities is recommended to develop a national vision on potential of geothermal energy in current and future applications, to identify current non-technical barriers in the Dutch legal Framework and to advise on policies and instruments to develop this potential. The advise should lead to the adoption of a national geothermal strategy including the contribution to the NREAP’s targets (C.2.1).
Addendum D

Responses received to the Public Consultation Process on Geothermal Energy in Ireland 2008

The following presents the results of the ongoing consultation on geothermal energy regulation in Ireland as initiated in June 2008 and continued through 2009 by the Department of Communications, Energy and Natural Resources of the Irish Government.

INTRODUCTION

One of the main tasks of the departmental Working Group on Geothermal Energy was to undertake a national consultation exercise seeking the views of industry and the public on the development of geothermal energy in Ireland; the barriers to its exploitation; views as to how these could be overcome; and possible frameworks for its regulation.

Public consultation on geothermal energy took place between 3rd June and 8th August 2008. The exercise consisted of 18 questions and allowed for submissions to be made online, by email and by hard copy. 32 submissions were received from the following stakeholder categories:

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- professional and representative bodies (IGI, GAI, South Dublin Chamber);
- energy industry (Geothermal Energy Ltd., Surface Power, Buildings Energy Unit UCD, one unidentified);
- academia (2);
- landowners (1), potential developers (1), and private persons (4)
- unidentified (6)

A summary of responses is provided taking a qualitative approach and with quotes from some of the more detailed solutions directly from the submissions. Statistical information on the submissions in the form of graphs is included for some answers despite a relatively modest sample.

RESPONSES TO THE ISSUE OF CLASSIFICATION OF GEOTHERMAL ENERGY

- There should be differentiation between different forms of geothermal energy, especially for regulation.
- Closed-loop Ground Source Heat Pumps are generally seen as a distinct category, but otherwise there is no consensus on what just criteria should be used. Depth is the most commonly favoured option, but end-use was also considered to be of primary relevance.
- The main current interest is on shallow systems both closed and open loop.

WHAT IS THE PERCEIVED COMMERCIAL EXPLOITATION POTENTIAL FOR GEOTHERMAL ENERGY IN IRELAND

- Space heating/cooling for commercial buildings is widely seen as the most promising area in Ireland, using shallow groundwater (<300m) as the heat source.
- Closed-loop Ground Source Heat Pumps will continue to be significant especially for domestic buildings.
- There is some potential for district heating.
- Small scale (1 – 5 MW) electricity generation was mentioned as having some potential by five respondents.
WHAT ARE THE MAIN PERCEIVED BARRIERS TO FURTHER DEVELOPMENT OF GEOTHERMAL ENERGY IN IRELAND

• Lack of knowledge of the resource is seen as the biggest barrier to increased utilisation, followed closely by lack of financial incentives.
• Regulatory uncertainties and issues with knowledge and expertise with the technology were the other issues mentioned most frequently.
• The (geological) knowledge base for deep geothermal resources is inadequate.
• The knowledge base for shallow resources is adequate but awareness is confined to a narrow group.
• Concerns over the lack of quality standards and service and consequent damage to the image of geothermal heating are significant for GSHPs.

WHAT ARE THE PERCEIVED SOLUTIONS TO THE IDENTIFIED BARRIERS

• Increased knowledge of geothermal resources
• Promotion of the value of shallow geothermal energy to consumers, architects, developers, etc. e.g. through workshops and demonstration projects with both industry and Government involvement (high level of support).
• Government support will be required for collecting and disseminating geothermal energy resource information (especially on deep resources), including establishing a dedicated unit with responsibility (in DECNR (GSI, EMD) or SEI).

WHAT REGULATION IS REQUIRED
Planning laws and groundwater legislation are most favoured for shallow developments. There is significant support for legislation analogous to minerals or hydrocarbons for deep developments. There is also majority support for a permitting system for deep exploration and exploitation, but most considered it was unnecessary for shallow systems. DCENR would be favoured agency for such licensing.

There is significant support for some form of regulation to ensure high standards of installation. A number of submissions have made detailed proposals.

ECONOMIC ISSUES
A wide variety of financial incentives suggested.

CONCLUSION
This public consultation exercise has delivered a range of possible approaches to the regulation of Geothermal Energy in Ireland. A round table discussion with all interested parties and looking into the above questions in more detail would probably help in reaching the best possible solution for the regulation of geothermal resources in Ireland. The exercise proved that there is a significant interest in this branch of renewable energy sources.

If any immediate conclusion can be drawn from this public consultation, it should probably state that, given Ireland’s geology and geothermal potential assessed to date, the local authorities would continue to carry the major responsibility for regulating geothermal developments through the application and extension of planning laws. Additionally, one of the government departments would most likely be in charge of licensing (regulating) the deep and commercial developments with EPA controlling the environmental aspects, and CER potentially becoming the regulatory body once high enthalpy resources/new technologies are developed. The importance of a precise definition of various types of “geothermal energy” for the purpose of regulation is a pre-requisite for discussing most of the above questions in more detail. This consultation exercise should help to bring about such definition.